



RÉPUBLIQUE
FRANÇAISE

*Liberté
Égalité
Fraternité*

GeoERA
GROUNDWATER



Geoscience for a sustainable Earth

brgm

PREPARING GROUNDWATER DECISION TOOLS AT PAN-EUROPEAN SCALE SUPPORTING THE WATER FRAMEWORK DIRECTIVE AND THE UN SUSTAINABLE DEVELOPMENT GOALS - GEOERA PROJECT OUTPUTS

Hinsby K.(GEUS), Gourcy L.(BRGM), Broers H.P.(TNO), van der Keur P.(GEUS), Bianchi M.(BGS)
19 May 2022

Description of the GEOERA projects

- GeoERA project: Establishing the European Geological Surveys Research Area to deliver a Geological Service for Europe
 - By contributing to the optimal use and management of the subsurface
 - Through four pillars: geo-energy, raw material, Information platform and **groundwater**
- Provide and disseminate spatial information (**data and indicators**) on their respective resources through the platform EGD
- Based on common methodologies shared by all EU countries represented in EGS



Funded by EGS and European Union Horizon 2020 programme

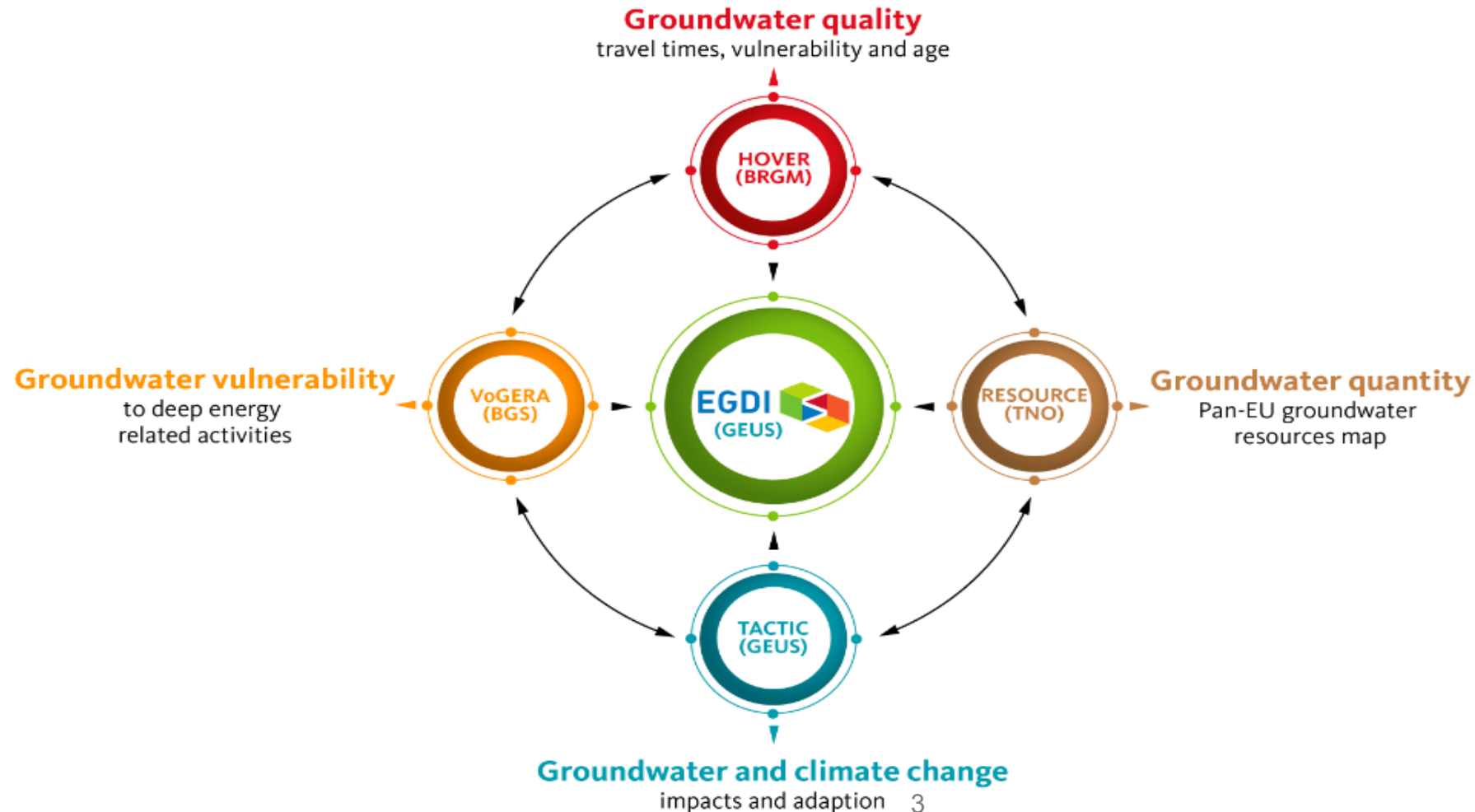


This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 731166



The GEOERA Groundwater projects

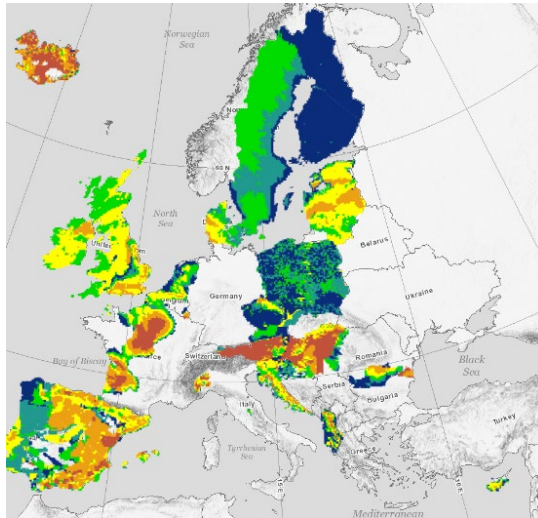
Research and information products from local to Pan-European scale



The GEOERA Groundwater projects

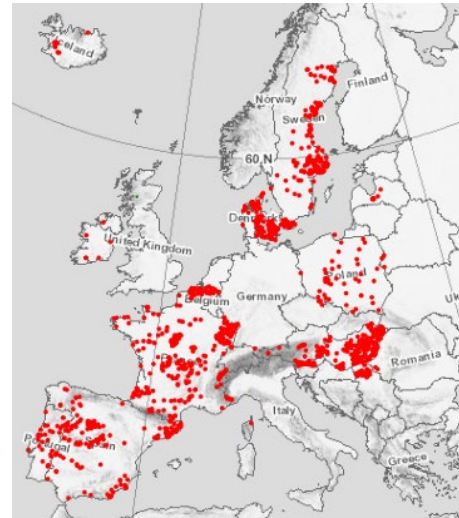
Contributing to the GEOERA platform

1) Improved access to downloadable groundwater quantity and quality data at local to Pan European scale

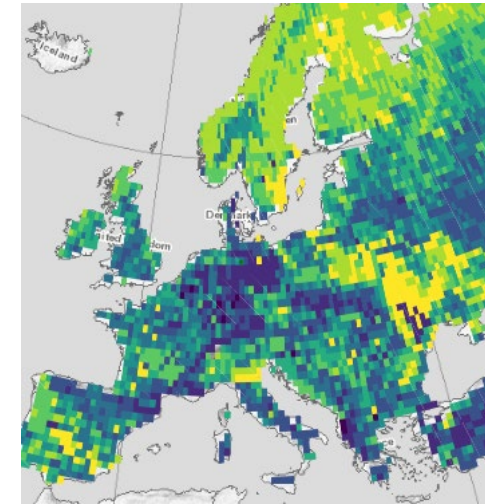


Water volumes and aquifer characteristics in European aquifers

2) State-of-the-art tools to support sustainable decision making in relation to the water-food-energy-ecosystem nexus (interrelated resource systems)



Groundwater quality in European aquifers: here Arsenic > Drinking Water Standard



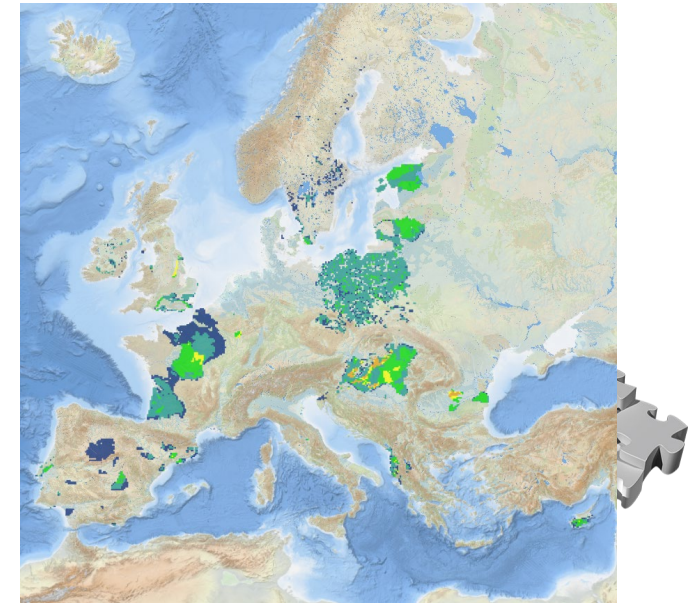
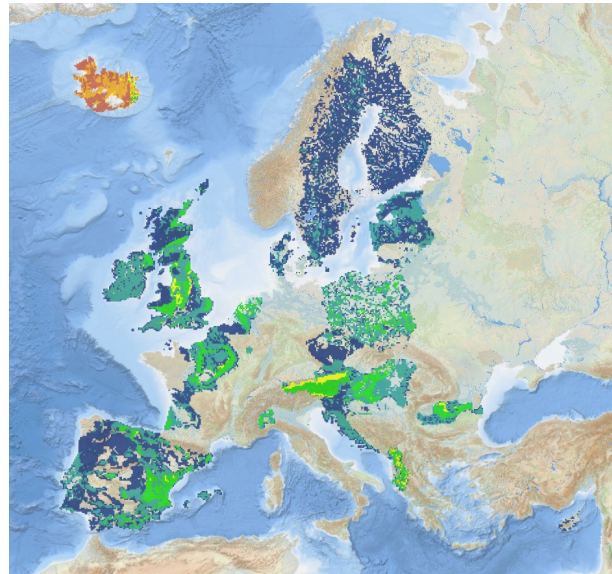
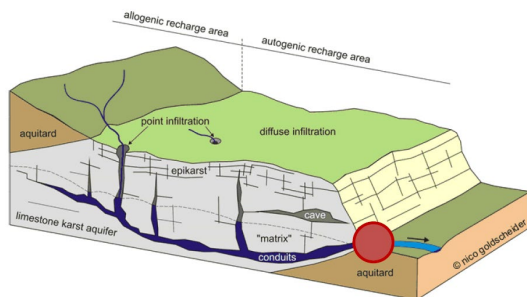
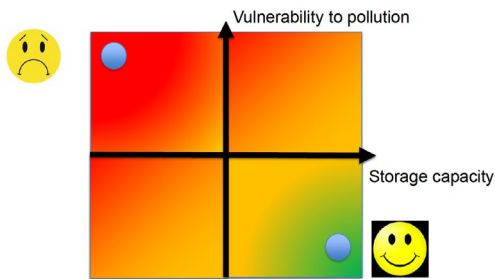
Nitrate in the unsaturated zone infiltrating to groundwater

3) Guidelines and recommendations, pilot studies (reports)

GEOERA can accelerate progress toward the SDG/WFD objectives

SGD 6.1. Achieve universal and equitable access to safe and affordable drinking water for all and WFD quantitative status

- GEOERA RESOURCE → data and indicators on groundwater availability
 - Fresh water storage under our feet (easy access) in unconfined and confined aquifers
 - Specific karstic area vulnerability and water availability assessment



GEOERA can accelerate progress toward the SDG/WFD objectives

SGD 6.3. Improve water quality by reducing pollution,... and WFD chemical status

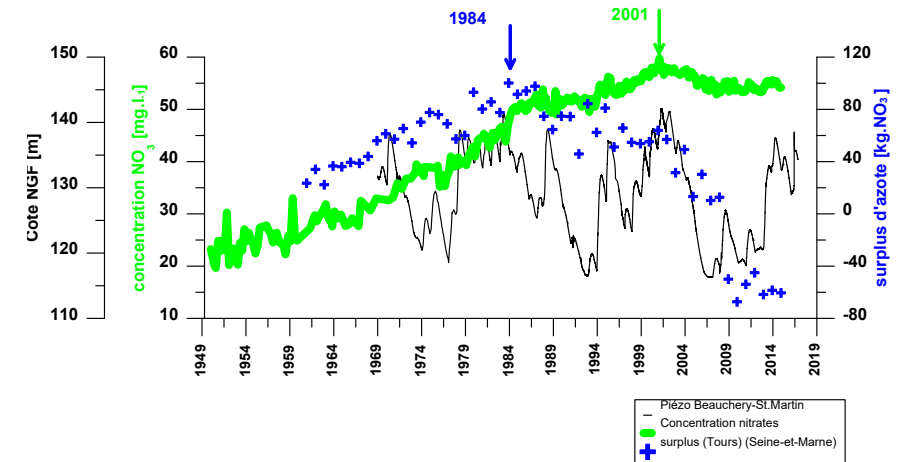
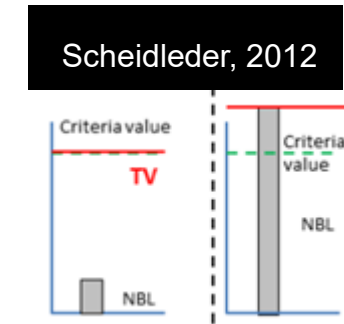
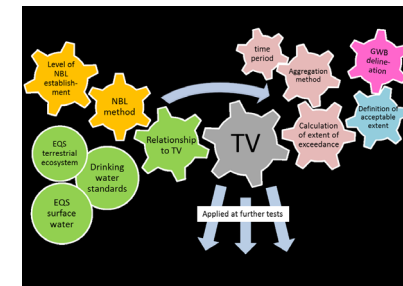
NBL and TV

Some elements (mainly inorganic trace elements) are naturally present at high concentrations ($>TV$) – The threshold values have to be adjusted in order to take this information into account
-> common methodology but huge differences in the ranges of TVs across Europe -> geological heterogeneity?
aggregation methods? Assessment for TV or NBL?

Time delay

Trend and trend reversal

Essential parameters to evaluate the importance of pressure and the efficiency in PoM -> GW may be of high mean residence time so create a delay between the effective pressure and the impact of water quality



GEOERA can accelerate progress toward the SDG/WFD objectives

GW chemical status 2019 @BRGM

Upscaling and downscaling

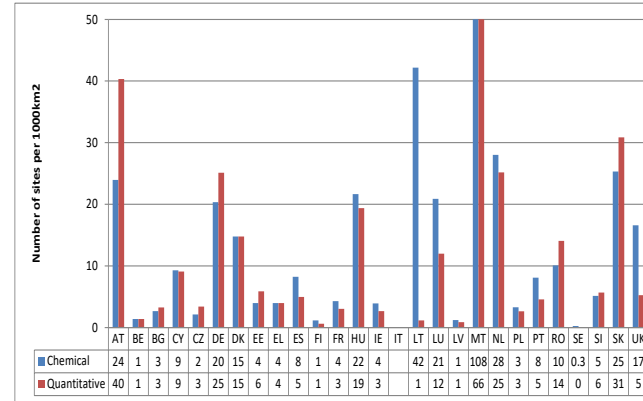
How to ensure that the basin evaluation (see figure) is reflecting local problems?
Public consultation / technical meetings presenting the results ->
accept and validation of first assessment made by the Basin Agencies

Improving knowledge

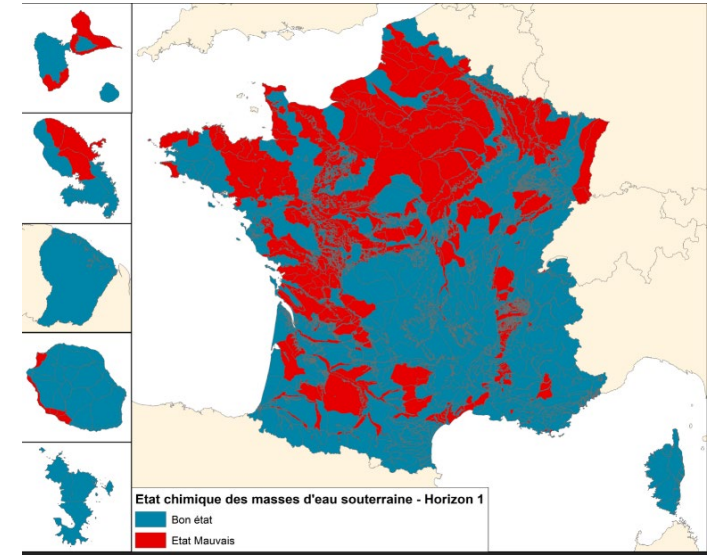
Monitoring network
Local/regional studies
Hydrogeological parameters

Homogeneous approach

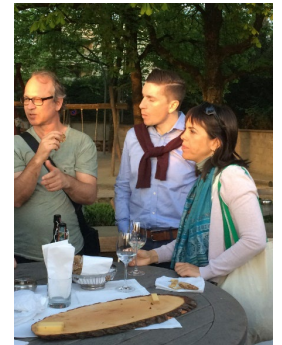
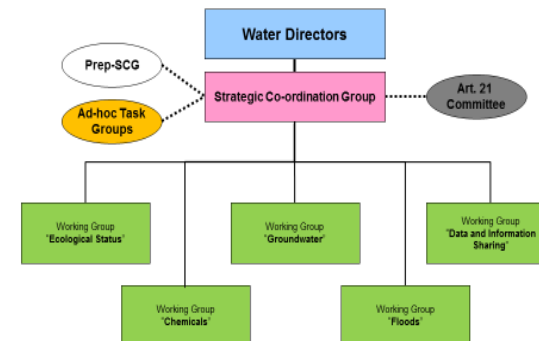
Guidance documents prepared
CIS /WG to propose actions,
update guidance documents and prepare
technical notes...
Web page (circabc.europa.eu)
Mixing GW specialists and GW managers
Exchange of information / discuss between MS



Number of groundwater monitoring sites per 100km²

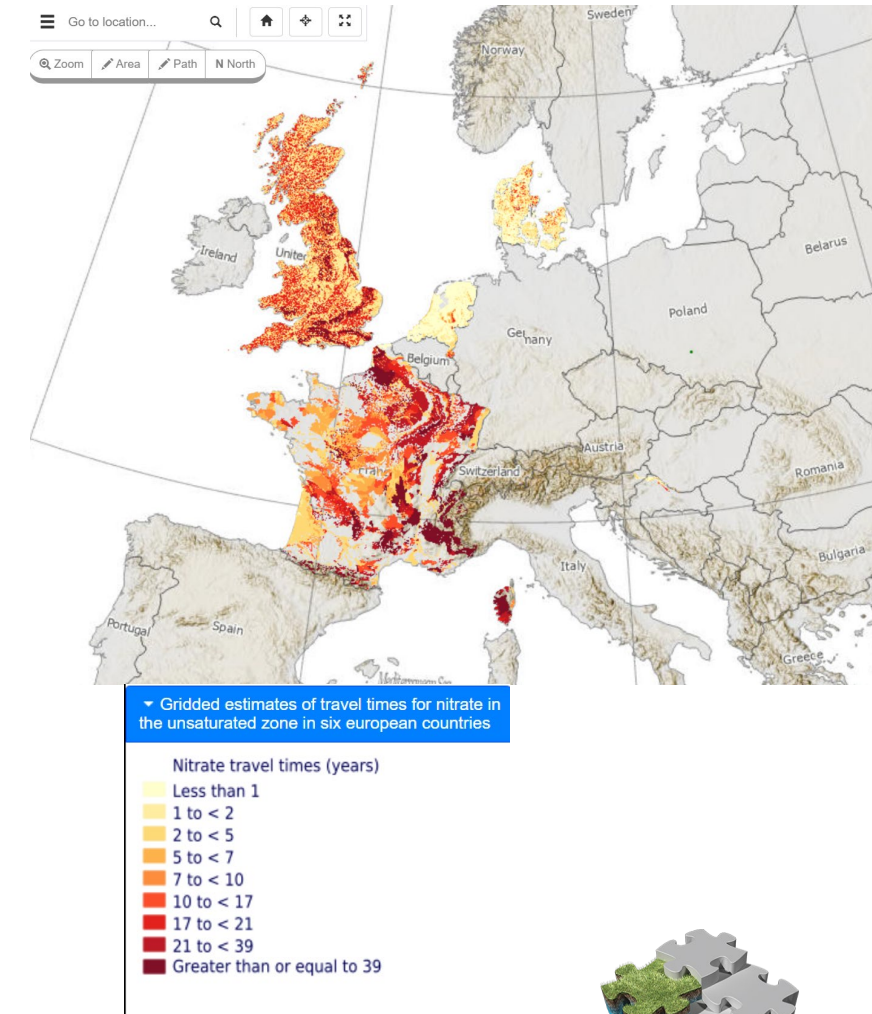


CIS Organisation 2019-2021



GEOERA can accelerate progress toward the SDG/WFD objectives

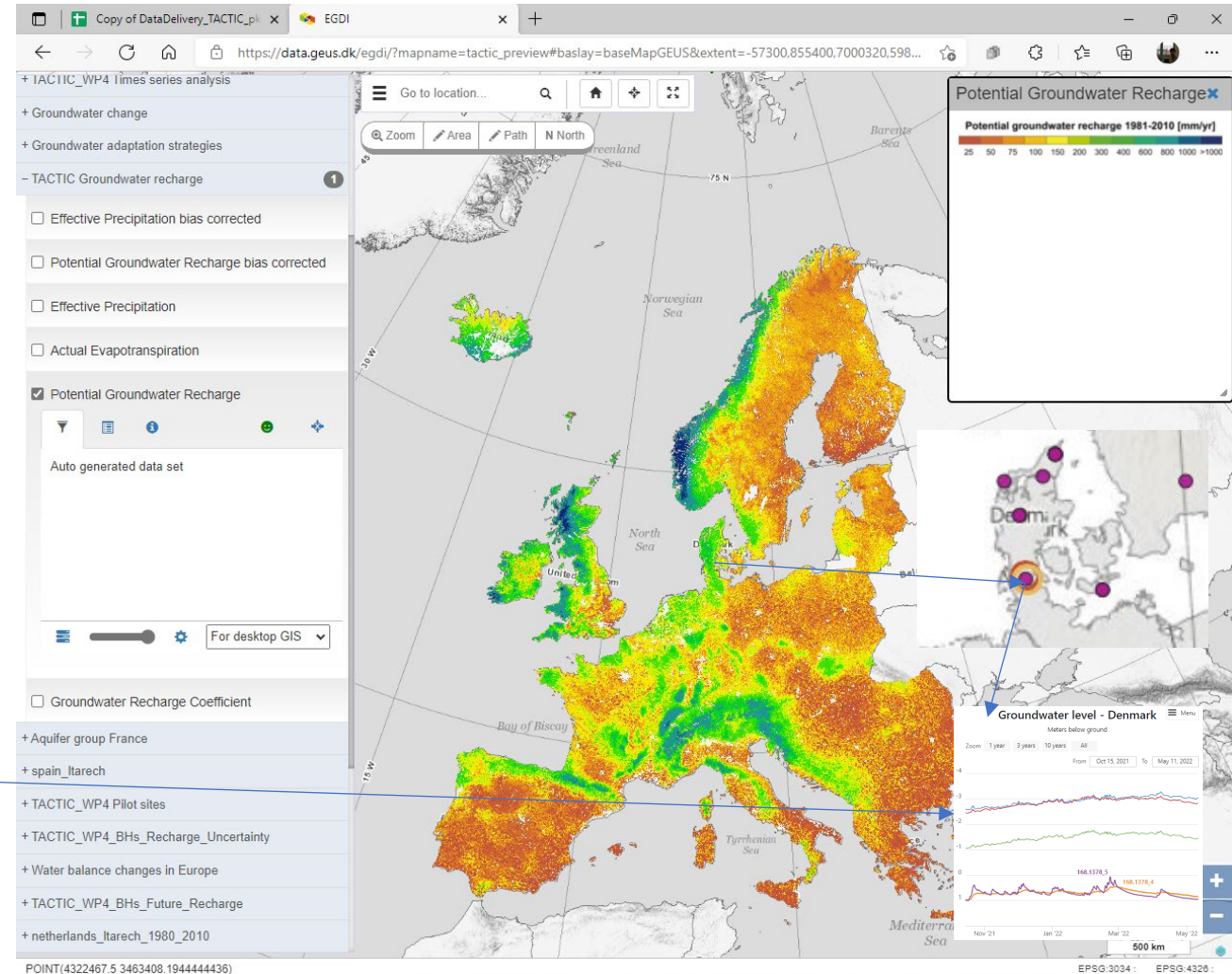
- GEOERA HOVER → data and indicators for the quality assessment :
 - Delineating the natural quality of water bodies (e.g. arsenic, Cl,...), taking into account geological context
 - Making available quality data at point scale and by GW bodies – for well-known and contaminants of emerging concern
 - Taking into account natural attenuation processes such as denitrification and **transfer time**
 - needed for the assessment of progress and efficiency of policies programme



GEOERA can accelerate progress toward the SDG/WFD objectives

SGD 6.4. substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and WFD

- GEOERA provide data and indicators on groundwater availability (RESOURCE) taking into account climate change (TACTIC):
 - Demonstrate the use of tools to assess climate change impact and adaptation strategies
 - Elaborate a Pan-European potential groundwater recharge map
 - Initiate a Pan-European map viewer of **near real-time water table measurements** across Europe ([EGDI](https://data.geus.dk/egdi/))



Lessons learned and future work required to achieve the objectives of the International Water Action Decade and SDG 6

- **EU heterogeneous geological context** leading to various characteristics of groundwater resources and availability
 - Adaptation to local conditions required
- **EU framework policy** providing a very good basis for an integrated management of resources
 - More a question of systematic implementation
- **Knowledge and Evidence based:** Make data FAIR (Findable, Accessible, Interoperable, Reusable)
 - Need for progressing and really implementing such principles
- **For decision-making:** necessity to translate data into indicators (integrated and self-explaining data)
 - Based on a Common Framework

Thank you



Email address: L.Gourcy@brgm.fr



Websites: www.brgm.fr and www.geoera.eu



Twitter: @BRGM_fr and @EuroGeoSurveys



LinkedIn: <https://www.linkedin.com/company/brgm/>
<https://www.linkedin.com/company/eurogeosurveys/>



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 731166

